CLAIMS

1. A speech recognition device, comprising:

input means for inputting a digital sound signal;

a sound level estimation means for estimating the sound level of a sound period based on the digital sound signal in a part of said sound period input by said input means;

sound level adjusting means for adjusting the level of the digital sound signal in said sound period input by said input means based on the sound level estimated by said sound level estimation means and a preset target level; and

speech recognition means for performing speech recognition based on the digital sound signal adjusted by said sound level adjusting means.

2. The speech recognition device according to claim 1, wherein

said sound level estimation means estimates the sound level of said sound period based on the digital sound signal in a prescribed time period at the beginning of said sound period input by said input means.

3. The speech recognition device according to claim 2, wherein

said sound level estimation means estimates the average value of the digital sound signal in the prescribed time period at the beginning of said sound period input by said input means as the sound level of said sound period.

4. The speech recognition device according to claim 1, wherein,

said sound level adjusting means amplifies or attenuates the level of the digital sound signal in said sound period input by said input means by an amplification factor determined by the ratio between said preset target level and the sound level estimated by said sound level estimation means.

5. The speech recognition device according to claim 1, further comprising a delay circuit that delays the digital sound signal input by said input means so that the digital sound signal in said sound period is applied to said sound level adjusting means together and in synchronization with the sound level estimated by the sound level estimation means.

6. The speech recognition device according to claim 1, wherein

said sound level estimation means includes:

a sound detector that detects the starting point of the digital sound signal in said sound period input by said input means;

a sound level estimator that estimates the sound level of said sound period based on the digital sound signal in a prescribed time period at the beginning of said sound period input by said input means;

a hold circuit that holds the sound level estimated by said sound level estimator; and

a storing circuit that stores the digital sound signal in said sound period input by said input means in response to the detection by said sound detector and outputs the stored digital sound signal in said sound period to said sound level adjusting means in synchronization with the sound level held in said hold circuit.

7. The speech recognition device according to claim 6,wherein

said storing circuit includes first and second buffers that alternately store the digital sound signal in said sound period input by the input means and alternately outputting the stored digital sound signal in said sound period to said sound level adjusting means.

8. The speech recognition device according to claim 1, wherein

said speech recognition means has a result of speech recognition fed back to said sound level adjusting means, and

said sound level adjusting means changes the degree of adjusting said sound level based on the result of speech recognition fed back from said speech recognition means.

9. The speech recognition device according to claim 8, wherein

said sound level adjusting means increases the amplification factor for said sound level when speech recognition by said speech recognition means is not possible.

10. The speech recognition device according to claim 1, further comprising a non-linear processor that inactivates said sound level adjusting means when the sound level estimated by said sound level estimation means is within a predetermined range, activates said sound level adjusting means when the sound level estimated by said sound level estimation means is not in the predetermined range, and changes the sound level estimated by said sound level estimation means to a sound level within the predetermined range for application to said sound level adjusting means.

11. A speech recognition method, comprising the steps of:

inputting a digital sound signal;

estimating the sound level of a sound period based on said input digital sound signal in a part of the sound period;

adjusting the level of the digital sound signal in said sound period based on said estimated sound level and a preset target level; and

performing speech recognition based on said adjusted digital sound signal.

12. The speech recognition method according to claim 11, wherein

said step of estimating the sound level includes estimating the sound level of said sound period based on the digital sound signal within a prescribed time period at the beginning of said sound period.

13. The speech recognition method according to claim 12, wherein

said step of estimating the sound level includes estimating the average value of the digital sound signal in the prescribed time period at the beginning of said sound period as the sound level of said sound period.

14. The speech recognition method according to claim 11, wherein

said step of adjusting the level of said digital sound signal includes amplifying or attenuating the level of the digital sound signal in said sound period by an amplification factor determined by the ratio between said preset target level and said estimated sound level.

15. The speech recognition method according to claim 11, further comprising the step of delaying the digital sound signal so that said digital sound signal in said sound period is applied together and in synchronization with said estimated sound level to the step of adjusting the level of said digital sound signal.

16. The speech recognition method according to claim 11, wherein

said step of estimating the sound level includes the steps of:

detecting the starting point of the digital sound signal in said sound period;

estimating the sound level of said sound period based on the digital sound signal in a prescribed time period at the beginning of said sound period;

holding said estimated sound level; and

storing the digital sound signal in said sound period in response to the detection of the starting point of said digital sound signal and outputting said stored digital sound signal in said sound period in synchronization with said held sound level.

17. The speech recognition method according to claim 16, wherein

said storing step includes the step of storing the digital sound signal in said sound period alternately to first and second buffers and outputting the stored digital sound signal in said sound period alternately from the first and second buffers.

18. The speech recognition method according to claim 11, wherein

said step of performing speech recognition includes the step of feeding back a result of speech recognition during said step of adjusting the level of the digital sound signal, and

said step of adjusting the level of the digital sound signal comprises changing the degree of adjusting said sound level based on said fed back result of speech recognition.

19. The speech recognition method according to claim 18, wherein

said step of adjusting the level of the digital sound signal comprises increasing the amplification factor for said sound level when said speech recognition is not possible.

20. The speech recognition method according to claim 11, further comprising the step of inactivating the step of adjusting the level of the digital sound signal when said estimated sound level is within a predetermined range, while activating said adjusting step when said estimated sound level is not in the predetermined range, and changing said estimated sound level to a sound level within said predetermined range for use in adjusting the level of said digital sound signal.

21. A computer-readable speech recognition program enabling a computer to execute the steps of:

inputting a digital sound signal;

estimating the sound level of a sound period based on the input digital sound signal in a part of said sound period;

adjusting the level of said input digital sound signal in said sound period based on said estimated sound level and a preset target level; and

performing speech recognition based on said adjusted digital sound signal.